EXD.

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THE CHRYSOMELIDAE OF FLORIDA

By W. S. Blatchley
Dunedin, Florida

To the student of entomology the leaf beetles or Chrysomelidae comprise one of the most interesting families of insects. On account of their variation in form and color they have long been a favorite group of the systematic Coleopterists, while their leaf- and root-feeding habits have for many years attracted the attention of economic entomologists. The family is one of the largest among the Coleoptera, about 18,000 species being known to scientists. Of these Leng, in his recent catalogue, recognizes 974 from America north of Mexico. In the "Coleoptera of Indiana" 265 were included from that State and 20 or more additional ones have since been taken. The present list of 268 species and 15 varieties from Florida shows that the number known from each of these two states is very nearly the same.

The Chrysomelidae may be characterized and separated from our other Coleoptera as follows:

Size medium or small, rarely more than 13 mm. (one-half inch) in length; form variable, usually more or less oval and convex, never much flattened; color variable, often brilliant and shining; surface usually glabrous; antennae rarely more than two-thirds the length of body, filiform, the outer joints rarely subserrate or slightly thickened; front of head small, oblique or inflexed; base of antennae not at all surrounded by the eyes; thorax usually with distinct side margins; tarsi all 5-jointed, but the fourth joint very small and attached very closely to the base of the fifth, the tarsi therefore apparently only 4-jointed; sole usually densely pubescent.

Of the life habits of the great majority of the Chrysomelidae but little or nothing is known, except that the adults occur mainly on the foliage of plants. The larvae of only about 100 species are

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known, and only those which have proven especially injurious, such as the striped cucumber beetle and the Colorado potato beetle, have been studied in detail from egg to adult. There is therefore a most fertile field for pioneer work by young entomologists along this line.

All the species are diurnal in habit and move slowly over the surface of plants, to which they adhere by means of the dense brushes of hairs upon the under side of the tarsi. The eggs are usually yellowish and elongated and are generally laid upon the leaves or stems of the plants upon which the larvae feed. The latter are of varying form, but for the most part are fleshy convex or chunky hump-backed "slugs" or grubs, a familiar example being that of the Colorado potato beetle. Many of them live on the leaves of the plants, where they feed often in company with the mature insects. Those that live exposed to the light differ from the great majority of coleopterous larvae in being more or less highly colored. Some of them are flattened and curiously armed with spines, while others are partially covered with their own excrement. A few are leaf-miners or stem borers, and these are long and slender and without the conspicuous markings of those which feed in the open. The larvae of one large group are case-bearers; others, including an entire subfamily *(Eumolpinae)* are root-feeders. When ready to transform, many of the leaf-eating larvae fasten themselves by the tail or last abdominal segment to a leaf and enter the chysalis stage, while others go into the ground when about to change to a pupa. The case-bearers pupate within the sealed-up larval case.

The main object of the present paper is to list in natural order the species of Chrysomelidae which in the past have been recorded from Florida, and to show somewhat accurately their distribution in the State. Many of the older Coleopterists, including both Leconte and Horn, were content to put "Fla." or "Florida" after their descriptions, forgetting that the State is approximately 400 miles long, 360 miles wide across its northern border, and contains an area of nearly 60,000 square miles. Representatives of three distinct faunas, the Austroriparian, Subtropical and Tropical, live within its bounds, and the time has come when more definite and accurate distributional notes than those furnished by the mere name of the State are in demand.

Another object is to furnish some knowledge of the principal food plants of each species. But in compiling this data from printed records or from my field accession notes (now more than

10,000 in number) I have been surprised at the paucity of that knowledge. This is due principally to two reasons; First, few of our systematic coleopterists, both past and present, have been active collectors, but have relied largely upon others to furnish their specimens, and neither they nor the collectors kept or recorded ecological data; second, the collecting of beetles in recent years has largely been done by the sweep-net, and this method of capture prevents the food plant being definitely known, unless, as is seldom the case, the vegetation is of a single species. It is only, therefore, of the more common and destructive species that the food plant can be stated with accuracy. The notes, as given after each species, furnish, therefore, information as to the kind of a habitat in which the species may usually be found, rather than accurate knowledge as to its host plant.

The sources of information on which the present paper is based are as follows: *(a)*. My private collection, taken personally, mainly during the months from November to April inclusive, during the past eleven years, and principally in the southern half of the State. In this collection are those species whose serial numbers are preceded by an asterisk (*) numbering 184 of those recorded from the State; *(b)*. The Florida Chrysomelidae in the collection of W. T. Davis, Staten Island, N. Y., which were sent on to me for examination; *(c)*. The collection of the Agricultural Experiment Station at Gainesville, which I have examined in part there, and which in part has been sent to me for identification; *(d)*. The printed records of Florida species as given in the works mentioned in the "List of Works Cited" which follows. A few of these records are open to question as to their proper identification at the time the record was made; *(e)*. Manuscript records, especially those of Schwarz and Hamilton mentioned in the "List of Works Cited," also others kindly sent me by Prof. J. R. Watson, Chas. Schaeffer, H. C. Fall, J. N. Knull, Chas. W. Leng and others.

List of Works Cited in the Present Paper

Arranged Alphabetically by Authors and Years of Publication.

BARBER, H. S.—1916—A Review of North American Tortoise Beetles. Proc. Ent. Soc. Wash., XVIII, 113-127.

BLATCHLEY, W. S.—1902—A List of the Coleoptera taken in the vicinity of Ormond, Florida in March and April, 1899. A Nature Wooing at Ormond by the Sea, pp. 233-238.

1910—An Illustrated Descriptive Catalogue of the Coleoptera known to Occur in Indiana, pp. 1-1386. Chrysomelidae pp. 1095-1233.

1913—On some Apparently New Coleoptera from Indiana and Florida. Can. Ent., XLV, 21-24.

1914—Notes on the Winter and Early Spring Coleoptera of Florida, with Descriptions of New Species. Can. Ent., XLVI, 62-67; 88-92; 140-144; 247-251.

1916—A New Genus and Species of Nitidulini with Descriptions of other New Species of Coleoptera from Indiana and Florida. Can. Ent., XLVIII, 91-96.

1917—On some New or Noteworthy Coleoptera from the West Coast of Florida. Can. Ent., XLIX, 137-143; 236-240; 272-279.

1918—Same, Pt. IV. Can. Ent., L. 52-59.

1919—Some New or Scarce Coleoptera from Western and Southern Florida.—III. Can. Ent., LI, 65-69.

1920—Notes on the Winter Coleoptera of Western and Southern Florida with Descriptions of New Species. Can. Ent., LII, 42-46; 68-72.

1920a—Notes on some Coleoptera taken in the vicinity of Dunedin, Florida in the Spring of 1920, with Descriptions of New Species. Can. Ent., LII, 259-264.

1921—Notes on Indiana Halticini with Characterization of a New Genus and Descriptions of New Species. Journ. N. Y. Ent. Soc., XXIX, 16-27.

1922—Some New and Rare Coleoptera from Southwestern Florida. Can. Ent., LIV, 9-14; 27-33.

1923—Notes on the Coleoptera of Southern Florida with Descriptions of New Species. Can. Ent., LV, 13-20; 30-36.

1924—New Coleoptera from Southern Florida with Notes on Other Interesting Species. Can. Ent., LVI.

BOWDITCH, F. C.—1909—Notes on Pachybrachys and Descriptions of New Species. Can. Ent., XLI, 237-244; 285-292; 312-324.

CASTLE & LAURENT—1896-'97—April Collecting in Georgia and Florida. Ent. News, VII, 300-305; XIII, 7-9.

CROTCH, G. R.—1873—Materials for the Study of the Phytophaga of the United States. Proc. Acad. Nat. Scie., Phil., XXV, 19-83.

DOZIER, H. L.—1918—An Annotated List of Gainesville, Florida Coleoptera. Ent. News, XXIX, 295-298; 331-335; 370-374.

FALL, H. C.—1910—Miscellaneous Notes and Descriptions of North American Coleoptera. Trans. Amer. Ent. Soc., XXXVI, 89-197.

1915—A Revision of the North American Species of Pachybrachys. Trans. Amer. Ent. Soc., XLI, 291-486.

HAMILTON, DR. JOHN—1888—A Manuscript List of Coleoptera taken in the vicinity of St. Augustine, Florida by Mr. Chas. Johnson.[1]

1894—Coleoptera taken at Lake Worth, Florida. Can. Ent., XXVI, 250-256; XXVII, 317-322.

HORN, G. H.—1883—Miscellaneous Notes and Short Studies of North American Coleoptera. Trans. Amer. Ent. Soc., X, 269-312.

1889—A Synopsis of the Halticini of Boreal America. Trans. Amer. Ent. Soc., XVI, 163-320.

[1]See Schwarz, Proc. Wash. Entom. Soc., No. 3, 1889. All St. Augustine records by Hamilton refer to his list.

1892—The Eumolpini of Boreal America. Trans. Amer. Ent. Soc., XIX, 195-234.

1893—The Galerucini of Boreal America. Trans. Amer. Ent. Soc., XX, 57-136.

LECONTE, J. L.—1878*—New Species of Coleoptera from Florida. Proc. Amer. Phil. Soc., XVII, 373-434.

1880—Short Studies of North American Coleoptera. Trans. Amer. Ent. Soc., VIII, 163-218.

LENG, C. W.—1891—Review of the Donacia of Boreal America. Trans. Amer. Ent. Soc., XVIII, 159-176.

1920—Catalogue of the Coleoptera of America North of Mexico, pp. 1-470.

SCHAEFFER, CHAS.—1919—Synonymical and other Notes on some Species of the Family Chrysomelidae and Descriptions of New Species. Journ. N. Y. Entom. Soc., XXVII, 307-343.

SCHWARZ, E. A.—1878*—Descriptions of New Species of Coleoptera from Florida. Proc. Amer. Phil. Soc., XVII, 354-372.

1878*—List of Species of Coleoptera from Florida. Proc. Amer. Phil. Soc., XVII, 434-472.[2]

SCHWARZ, E. A.—Ms.—A manuscript list of all additions to his "Coleoptera of Florida," up to about 1910. This List is in the Smithsonian Library.[3]

SLOSSON, MRS. A. T.—1893—Spring Collecting in Northern Florida. Journ. N. Y. Ent. Soc., I, 147-152.

1895—Coleoptera of Lake Worth, Florida. Can. Ent., XXVII, 9-10.

WICKHAM, H. F.—1909—A List of the Van Duzee Collection of Florida Beetles. Bull. Buffalo Soc. Natural Sciences, IX, 399-405.

In the list of species which follows, the sequence and the nomenclature, with rare exceptions, is that of Leng's "Catalogue of the Coleoptera of America North of Mexico," and the number in parenthesis before each species is that of said catalogue. Where a species was originally described from Florida the date of year and page follows the name of author, the name of the publication in which the description appeared being given after the date of that year in the "List of Works Cited."

The names of authors whose locality records are mentioned or of those who furnished manuscript data are, to save space, usually abbreviated as follows:

Barber, H. S.=Br.	Leconte, J. L.=Lec.
Blatchley, W. S.=Bl. or Blatch.	Schaeffer, Chas.=Schf.
Castle & Laurent=C. & L.	Slosson, Mrs. A. T.=Sl.
Davis, W. T.=Dav.	Schwarz, E. A.=Sz.
Dozier, H. L.=Doz.	Watson, J. R.=Wat.
Knull, J. N.=Kn.	Wickham, H. L.=Wic.

[2]The three papers marked with an asterisk comprise the work of Schwarz entitled "The Coleoptera of Florida." Since the Leconte article is included I have thought it best to list the three separately

[3]See Can. Ent., L, 1918, 419.

By our later systematists the family Chrysomelidae is separated into 15 groups or subfamilies, 12 of which are represented in Florida. Each of these is mentioned under the brief characterization of its first genus in the list which follows.

LIST OF SPECIES AND VARIETIES

I. Donacia Fabricius.

Elongate or oblong graceful beetles of medium size (6-12 mm.), occurring upon the foliage and flowers of water-lilies, pickerel-weed, skunk cabbage, arrow-head and other semi-aquatic plants; the larvae living under water and feeding upon the roots, the adults flying actively about and mating usually within the flowers. They have the head constricted to form a neck behind the eyes, thorax narrower than elytra and without side margins; mandibles simple; first ventral about as long as the others united. (Subfamily *Donacinae.)*

1. (15197). **D. floridae** Leng, 1891, 196.—Types in the U. S. N. Mus. from Enterprise. No other Florida record. Food plant white water-lily, *Castalia odorata* (Dryand). The males differ from those of all others in having the hind femora much surpassing the tips of elytra.

2. (15198a). **D. cincticornis** Newn.—Crescent City (Sz. Ms.). "Jupiter and Lake Worth; not a var. of *proxima* but a distinct species" (Schf. Ms.).—White water-lily; yellow water-lily, *Nymphaea advena* Sol.; pondweed, *Potamogeton.*

3. (15200). **D. hypoleuca** Lac.—Enterprise, Lake Poinsett, Crescent City (Sz. Ms.). Lake City (Wat.). Schaeffer (Ms.) says that the Crescent City specimens in the U. S. N. Mus. are *texana.*

4. (.....). **D. texana** Crotch.—"Crescent City; a distinct species, not the female of *hypoleuca* as stated by Leng." (Schf. Ms.).—Yellow water-lily.

*5. (15202). **D. piscatrix** Lac.—Throughout the State. Common about Dunedin, Mch.-Apr., mating in flowers of its only food plant, the yellow water-lily.

6. (15206). **D. rugosa** Lec., 1878, 415.—Described from Enterprise. Crescent City (Sz. Ms.).—Pickerel-weed, *Pontederia cordata* L.

7. (15212). **D. torosa** Lec.—"Specimens in Leng Collection labelled 'Fla.'; occurs in Massachusetts on *Carex* and grasses in moist meadows" (Schf. Ms.).

8. (15215). **D. metallica** Ahr.—"Specimens in Leng Collection labelled 'Fla.'" (Schf. Ms.). In Indiana this species has been taken only between

the bases of the leaves of skunk cabbage, *Spathyema foetida* (L.); in Massachusetts on the tussock sedge, *Carex stricta* Lam.

II. Lema Fabricius.

Oblong, often prettily variagated beetles of small size (4-7 mm.) occurring usually on herbage in dense woodland or moist places. Head with a neck behind eyes; elytral punctures in rows; thorax constricted at middle; tarsal claws simple. The larvae feed on foliage and, for protection, cover their backs with their own excrement. (Subfamily *Criocerinae.)*

*9. (15236). **L. cornuta** Fabr.—Numerous records from the northern half of the State. Taken by me at Lake Wales, Marco and Dunedin, Mch.-Apr., while sweeping natal grass and other herbage. Miami (Kn.).

10. (15238). **L. texana** Cr.—Suwannee Springs; on flowers of the butterfly-pea, *Clitoria mariana* L. (Sl., 1893). The only definite State record.

*11. (15239). **L. brunnicollis** Lac.—Fernandina and St. Augustine on *Carduus* (Sz.). Common at Sarasota and Sanford, Febr.-Mch., on flowers of a thistle, *Carduus spinosissimus* Walt. (Bl., 1913). L. Wales and Gainesville; common, June-Sept., on live oak (Wat.).

12. (15242). **L. maculicollis** Lac.—L. Ashley and Haw Creek (Sz.). Cleveland (Kn.).

13. (15243). **L. collaris** Say.—Enterprise (C. & L.). The only State record.—In Indiana the food plant is the spiderwort, *Tradescantia virginiana* L.

*14. (15246). **L. solani** Fabr.—Throughout the State. Occurs mainly in March and April on the black nightshade, *Solanum nigrum* L., and allied plants.

15. (15248). **L. circumvittata** Clark.—Listed as *L. conjuncta* Lac. from Enterprise (Sz.); afterwards (Ms.) from St. Augustine and Crescent City, and changed to *circumvittata.* L. Worth (Ham.); Clearwater (Wic.).

16. (15250). **L. conjuncta** Lac.—L. Worth (Ham.). Gainesville, swept from oak, Apr. 1 (Doz.). Perhaps confused with *circumvittata,* as not mentioned from Florida in Leng Catalogue.

17. (15251). **L. confusa** Chev.—Crescent City (Sz. Ms.); Enterprise, Apr. 16 (C. & L.). Biscayne Bay (Schf. 1919.).

*18. (15253). **L. trilineata** (Oliv.).—Throughout the State. Abundant at Gainesville, April, on ground cherry (Doz.). Rare at Dunedin. Food plants, potato, night-shade, horse-nettle and other Solanaceae.

*19. (15256a). **L. sexpunctata albina** Lac.—Enterprise (C. & L.); Crescent City (Sz. Ms.); Sanford, Apr. 4 (Bl.); Gainesville on dog-fennel, Aug. 4 (Wat.); Ft. Myers (Wic.). Cleveland (Kn.).

*19a. (15256b). **L. sexpunctata ephippium** Lac.—Crescent City (Sz. Ms.); Ormond, Apr. 4 on blossoms of thistle (Bl., 1902); Sanford, Apr. (Bl.); Gainesville on basswood, June (Wat.).

(To be continued)

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THE SCIENTIST

The following from the Cincinnati Commercial Tribune, published during the meeting of the American Association for the Advancement of Science in that city, is so good, and incidentally, so comforting to our conceit, that we reproduce it here for the benefiit of our readers:

"Popularly speaking, the scientist is to society in general a something apart. We know he is there busy on the inside with laboratory experiment and busy on the outside with labored research in investigation. We regard him highly, respect him sincerely and forget him entirely until some wonder work of development or discovery brings some one of him into the limelight of public attention.

"Now this is not unflattering to the scientist, but on the contrary is wholly complimentary. We recognize him as our guide, philosopher and friend blazing the way to knowledge, but some planes removed from us in the average of the upward climb toward achievement. Except the fundamentalists whose dogma he may disturb, we accept him at his word and take what he teaches us as the latest in that particular line. In the fields of utility we grant him the halo of a benefactor of his race. We recognize him as the giver of good gifts in adding constantly to the interest and comfort, even the exhilaration and luxuriousness of life."

THE CINCINNATI MEETING OF THE A. A. A. S.

The Association meetings extended from Dec. 27 to Jan. 2. Among the affiliated societies meeting with the Association at which papers on entomology were read were the Entomological Society of America, the Am. Ass. of Economic Entomologists, and the Ecological Society of America.

In his address, "A Retrospect", the retiring president of the Association, Prof. J. Playfair McMurrick, reviewed the progress that has been made in the Association and in science in general since the organization of the Association seventy-five years ago. He spoke especially of the revolutionary influence of the doctrine of evolution upon science in particular and human thought in general. In conclusion he stated: "No, evolution is not dead, nor can it be killed by legislative enactment."

In the public address of the Entomological Society Dr. James G. Needham spoke on "The Role of Insects in Food Production". He drew attention to the practicability of using insects as food for other animals, especially fishes and birds. While most farmers are spending their good money for insecticides to kill insects Dr. Needham is raising them as a forage crop.

Among the papers presented before the Ecologists was one on the use of calcium cyanide in exterminating burrowing rodents. This substance should be effective against our "salamanders" and possibly "gophers".

In the meeting of the Economic Entomologists the Japanese Beetle and the European Corn Borer received much attention as did also the use of oil emulsions instead of lime-sulphur for the control of the San Jose scale. The following members of our own societey were elected to membership in the association: Reginald Hart, Donald Reese, and F. G. Tooke. H. L. Dozier was elected to active membership. A. F. Burgess was elected president.

Our members present at the meeting were Geo. Ainsley, E. W. Berger, Dr. H. S. Davis (Washington, D. C.), H. L. Dozier (and his newly acquired wife), H. C. Goodwin, Herbert Osborn, Donald Reese and J. R. Watson.

RECENT PUBLICATIONS ON FLORIDA INSECTS

Three bulletins and articles recently published by our members are: "Bordeaux-oil Emulsion"—Winston, Bowman, and Yothers. U. S. D. A. Departmental Bulletin 1178.

"Striped Sod Worm, *Crambus mutabilis* Clemens"—Geo. G. Ainslie. Jl. Ag. Research Vol. XXIV, No. 5.

"Synopsis and Catalog of the Thysanoptera of North America (with a translation of Karny's Keys to the Genera of Thysanoptera and a Bibliography of Recent Publications)"—J. R. Watson. Univ. of Fla. Ag. Exp. Station, Bull. 168.

We also note, "The Puss Caterpillar and the Effects of its Sting on Man"—F. C. Bishop. U. S. D. A. Departmental Circular 288.

In the Jl. of Agric. Research Vol. XXV, No. 5, Mr. A. C. Baker describes a new and possibly dangerous whitefly *(Aleurodicus manni)* from Honduras.

NOTES ON FLORIDA LEPIDOPTERA

D. MARSTON BATES

(Contribution from the Department of Entomology, Fla. Agr. Exp. Sta.)

Papilio polydamas L.

Grossbeck, in his Lepidoptera of Florida, gives only the indefinite locality "Indian River" for this species. It is, however, locally quite abundant in southeast Florida, and I have found it in both the adult and larval stages at Stuart, Palm Beach, Ft. Lauderdale, and Miami. The larva is at times destructively abundant on *Aristolochia.*

Papilio troilus form **iloneus** A. & S. (=*texanus* Ehr.)

Larvae of this species that were collected on camphor have been sent in to the Experiment Station on several occasions.

Anartia jatrophae L.

Holland (1898) erroneously states that the early stages of this genus and species are unknown, and apparently all who have followed him have fallen into the same error. Scudder, Proceedings of the American Academy of Arts and Sciences, 1892, p. 239, gives the following note on the larva: "Black, the front of the first thoracic segment, the prolegs, and the base of many of the spines more or less ochraceous. *Chrysalis:* Smooth and wholly black, except the borders of the antennal cases and the stigmatal fissures, which are whitish, and the cremaster is somewhat ochraceous at base. Food-plant, Lippia."

Seitz, Macrolepidoptera, Vol. V, cities *Jatropha manihot* as the food-plant.

Very abundant in south Florida at times, especially in the Everglades, along the banks of the canals.

Victorina steneles L.

This is another one of the many species, the early stages of which Holland erroneously states to be unknown. Scudder, op. cit., p. 238, gives the following note on the early stages of this species: "*Mature Caterpillar:* Coronal spines of head 8 mm. long, red, broadly crimson at base, whitish in the middle and brownish at tip. Body velvety black, the spines reddish gray, a mediodorsal stripe of stiff pile, less abundant than the unequal papilla-seated pile on the sides. Feeds on *Blechum.*"

Seitz, Macrolepidoptera, vol. V, p. 464 states that the life-history of *V. trayja* only is known, and that the food-plant is *Acanthaceae.*

Diaethria clymena Cramer

Early stages stated by Holland to be unknown. Described by Scudder *(op. cit.),* who states that the food-plant in Brazil is *Trema micrantha.* Another species of the genus, *Trema floridana* Britton is found in peninsular Florida and on the keys (Small), and is possibly the food-plant in Florida.

Athena peleus Sulz.

Scudder has given some notes on the early stages of this species in his above mentioned paper. I have frequently reared it at Ft. Lauderdale on *Ficus carica,* the cultivated fig. Scudder states that the food-plants are *Ficus* and *Anacardium.* Seitz states that the larva occurs on "Cachou" *(Anacardium).*

The butterfly is quite common in the "hammocks" of southeast Florida, where the *Ficus* species are found.

MEETINGS OF THE FLORIDA ENTOMOLOGICAL SOCIETY

December 7, 1923. A regular meeting was held in Language Hall, Pres. G. B. Merrill in the chair. Members present: Rogers, Berger, Watson, Gray, Hubbell, Major Floyd, Bates, Walker, Merrill, O'Byrne, Stirling, and Beyer. Dr. F. Thome was a visitor.

The address of the meeting was a very interesting narrative by Mr. Hubbell on a collecting trip to Honduras. Prof. Hubbell visited Honduras in the spring of 1923 with an expedition of entomologists and pathologists in charge of Dr. Johnson. The object

of the expedition was to investigate insects which are a source of great loss in the banana plantations of the United Fruit Co. Because of the ravages of the Panama blight disease in the older plantations the company is obliged to constantly seek new banana lands and are constantly pushing their plantations up the valleys towards the dry interior.

Most of the collecting done by the speaker was along the Tela and Truxillo divisions of the company's railroad, but a trip was made over the mountains into the more arid interior. Here the fauna was quite different from that of the banana country. Dr. Hubbell found the orthoptera of the region especially interesting. Ticks were very abundant and troublesome. He spoke of the very interesting ants which inhabit the thorns of the *Acacia* trees.

In the humid coastal section many of the insects were specialized for arboreal life. Gorgeous butterflies were very abundant, as were also snakes. Mimicry was common. Dr. Hubbell did some collecting about lights at night thereby catching many valuable specimens that otherwise would have been missed.

He described the culture of bananas. Paths are cut thru the jungle and the banana slips planted. The entire forest is then cut and, when sufficiently dry, burned. The banana shoots immediately spring up and have a start of the other vegetation. Practically no cultivation is given except to cut down the brush and old banana stalks.

January 18, 1924. The regular meeting of the Florida Entomological Society was held in Language Hall, the president, Geo. B. Merrill, in the chair. The following members were present: Bates, Berger, Beyer, O'Byrne, Merrill, Montgomery, Walker, Watson.

Meeting opened with the election of officers. All former officers were reelected.

The program of the evening included reports from several members who were in attendance at the Cincinnati and Birmingham meetings. The first speaker, Dr. E. W. Berger, reported that the A. A. A. S. meetings at Cincinnati were well attended. He gave a brief account of Dr. Hamlin's address on the biological control of cactus as illustrated by Australia's struggle to control the prickly pear cacti which overrun the entire country, by means of introducing insects and diseases. Great difficulty in introducing any control measures is experienced because of the fact that

the government owns the land and leases it for periods of years to individuals, who as a consequence, have little interest in improving it.

Professor J. R. Watson spoke of attending three meetings, the Entomological Society of America, the American Association of Economic Entomologists, and the Ecological Society of America. He also reported an interesting conference on the Mexican bean beetle. This beetle is characteristic of mountainous regions and apparently need not be feared in the coastal plain.

The meetings of the Association of Southern Agricultural Workers at Birmingham, Alabama, were discussed by Dr. Montgomery, who reported an address by Dr. Hull of Mississippi, who spoke of cotton production as a matter of fundamental importance, and told of the committee which was appointed to secure all possible information on cotton production and boll weevil control. B. R. Coad, of the Bureau of Entomology, U. S. D. A., gave an interesting address on boll weevil experiments. The net results of experiments at Tullulah, La., were given by means of charts, showing the saving in dollars per acre by the use of different methods of control. In the absence of Mr. George B. Smith, Dr. Newell was called on and gave a brief report on the results of the Florida Method for 1923. It was recommended by the committee that on the poor, low-yielding soils of the Coastal Plain the Florida Method be used, and in the rich delta regions the dusting method be used, as under the wide range of conditions no one method can be successfully applied.

The treatment of cotton plants just before formation of squares was recommended. The treatment ordinarily would be applied about May 20th and would consist in applying by means of a mop a calcium arsenate syrup mixture.

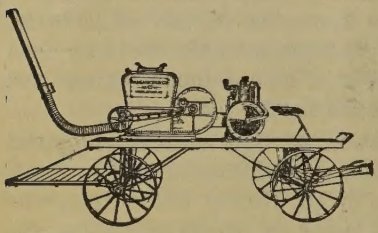
A new method of boll weevil control was demonstrated with the Barber machine, composed of a burner and copper coils, using a mixture of steam and kerosene vapor to destroy the weevils.

A. H. BEYER,
Secretary.

Dr. W. S. Blatchley expects to leave Dunedin about March 10 on a collecting trip to Miami and the Royal Palm Park. He is working on the heteroptera.

THEY CERTAINLY ACT THAT WAY

"Kindly give me the latest dope on the leaf-hopper or jazzid."
—A correspondent.



Niagara Orchard Duster

5-h. p. water cooled motor, and special orchard wagon. Weighs 1000 lbs. complete. Crop attachment for dusting potatoes and celery can be supplied.

Niagara Sulfodust

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